



The Colorado River Corridor -- A Decade of Fuels Treatment

Moab Fire District, Bureau of Land Management

The Bureau of Land Management (BLM) Moab Fire District boundary encompasses a unique and diverse array of geologic layers and vegetative communities. Three significant river corridors (Colorado, Green, and San Juan), several primary tributaries, many perennial streams, and vital riparian areas are located in each of the three field offices of the Moab Fire District (Moab, Monticello, and Price). Without exception, all of these waterways contain one or several types of invasive plant species including tamarisk and Russian olive and noxious weeds such as Russian knapweed.

A distinctive challenge for the BLM Moab Field office is that the Colorado riverway and the surrounding area have become a destination each year for millions of recreationists, many of whom camp at developed BLM recreation facilities along the waterways. BLM-maintained campgrounds were designed to provide a scenic camping experience close to recreation activity areas. Along the Colorado and its tributaries, the dense concentration of tamarisk and Russian olive has limited the space available in which to provide facilities, has gradually impeded recreational access to water, and has dramatically changed the visual aesthetic along the river corridor. In addition, existing developed and undeveloped camping areas surrounded by and continually encroached upon by invasives are at high risk from fire. Recreationists who visit the river corridors each year are also unwittingly contributing to the spread of Russian knapweed, which is spread readily by attaching to vehicle undercarriages.

Tamarisk (*Tamarix* spp.), also known as salt cedar, is a deciduous shrub-like tree that originated in central Asia and was introduced as an ornamental landscaping plant early in the nineteenth century in the western United States. By the mid-1900's, tamarisk populations were widely established in riparian corridors throughout the west. Because tamarisk stands develop into dense thickets, sediment accumulates in their extensive root systems and promotes further tamarisk growth. River and stream channels gradually narrow and flooding increases, which can impact critical fish



Campsite Surrounded by Tamarisk, Moab Field Office

habitat and degrade native plant habitat. Tamarisk not only uses groundwater needed by native cottonwood and willow but also increases surface soil salinity by depositing excess salts from groundwater, effectively inhibiting native plant germination.

The Russian olive (*Elaeagnus angustifolia*) trees that are interspersed with tamarisk along the Colorado River are also native to southern Europe and to central and western Asia and may alter native riparian dynamics in several ways. Native pioneer



Invasive Plants Line the Colorado River, Moab Field Office

species such as cottonwood and willows are generally shade intolerant and are not adept at voluntary establishment within dense vegetation. When Russian olive moves into a native riparian area, it establishes itself beneath the canopy of native trees and self-replaces until it becomes dominant. Russian olive is also better adapted than many other tree species to alkaline or saline soils, and frequently establishes on flood-disturbed sites which are also optimal for cottonwood seedlings.

Russian Knapweed



Russian Knapweed (*Acroptilon repens*) is a perennial plant of the aster (sunflower) family with an extensive root system that may extend to a depth of 23 feet. Russian knapweed is common along roadsides and riverbanks, and typically invades disturbed areas, forming dense single-species stands. Once established, Russian knapweed uses a combination of aggressive shoots and allelopathic chemicals to spread outward into previously

undisturbed areas. Allelopathic chemicals alter surrounding soils, effectively inhibiting the growth of other plants. A native to Eurasia, Russian Knapweed was introduced into North America in the early 1900s and has spread to most of the western United States. The weed is generally avoided by grazing animals due to its bitter taste, although it is poisonous to horses and can cause a neurological disorder called chewing disease.

Fuels treatment projects address a long-term goal of restoration with an immediate emphasis on hazardous fuels removal due to the magnitude of invasives along the riverways. Some studies show that the dense structure of tamarisk and Russian olive stands may actually be better at carrying fire than native vegetation.



Kane Creek Campground, Moab Field Office

Both invasives contribute to increased vertical canopy density, creating volatile fuel ladders that increase the likelihood of wildfire spread and impacts from high intensity heat. Tamarisk leaf litter also increases the frequency and intensity of fire and leaf litter has accumulated for many years wherever the tamarisk is found. Human-caused fire incidents along the riverway have multiplied as a result of the huge increase in tourism the last fifteen years.



2003 Tamarisk Fire, Moab Field Office

Cutting trunks and stems close to the ground followed immediately by application of an herbicide to the cut stems has proven to be effective in reducing tamarisk and Russian olive with little or no effect to surrounding vegetation. However, in the dense thickets along the riverway a concurrent problem with cutting can be the resulting piles and piles of dead and down fuel. Branches and stems can be piled and burned, but exact conditions are necessary during burning to prevent scorching and burning of adjacent vegetation. There are several types of mechanical devices that can be utilized to chop, shred, or masticate vegetation including a bullhog, roller chopper, mower, and hydroaxe. These types of machines can be effective in easily accessible areas where slopes are not too great, although after a section of tamarisk has been cut a thick layer of wood mulch remains on the ground. Excessive debris may necessitate further treatment such as prescribed burning, to reduce fuel loading.

In 1998, the Moab Field Office prepared an environmental assessment and issued a decision approving the cutting, burning, roller chopping, and herbicide treatment of noxious and invasive plant species along the Colorado, Green and Dolores rivers and in several riparian camping areas. A biological assessment was prepared to analyze potential effects to threatened and endangered fish and bird species from treatment activities. Informal Section 7 consultation was initiated with the U. S. Fish and Wildlife Service with concurrence of the “no adverse effect determination” findings. The Moab Fire District proceeded to treat several areas along the riverways, commensurate with funding and personnel resources.

There have been several projects in the last decade directed at reducing the number of invasive plants in critical areas. Selecting a control method that will be effective can be difficult in places that contain significant numbers of desirable shrubs and trees. In addition, much of the fuel reduction along the riverway is adjacent to campgrounds, which necessitates consideration of aesthetics when planning a treatment.



Burned Area from Tamarisk Pile Burn, Moab Field Office, 2002



Southwestern Willow Flycatcher

By 2002, both tourism and the number of campgrounds had increased, and a Determination of NEPA Adequacy concluded that the 1998 environmental analysis was applicable to authorize treatment of the additional campgrounds and other critical areas. Section 7 consultation with the U. S. Fish and Wildlife Service was re-initiated due to the necessity for treating during bird nesting season. The BLM received concurrence with the determination that treatment “may affect, but is not likely to adversely affect” with the caveat that southwestern willow flycatcher surveys would be conducted in suitable habitat prior to vegetation removal.

The Moab Fire District fuels team along with recreation and resource specialists, discussed treatment of campgrounds and the need to lengthen fuel breaks. Plans were made to remove tamarisk from around campgrounds over a period of time to help mitigate the loss of screening. It was recommended to the Field Office Manager that in planning for any future developed campgrounds, areas with heavy fuels should be avoided or fuel reduction activities should take place prior to campground construction. Early in 2002, fuel breaks and other treatment activities took place at developed sites including Big Bend, Negro Bill, Goose Island, Kings Bottom, Hittle Bottom, Hunter Canyon, and Spring Canyon (see map below). On April 29, 2002, a fire originated in tamarisk on the north side of the Colorado River near the Highway 191 bridge. High winds caused heavy spotting and the fire jumped to the south side of the river and spread toward the Goose Island campground. The new fuel break on the west side of the campground helped save a large portion of the campground from being damaged.



Tamarisk and Russian olive Interspersed with Desirable Vegetation

Results of the 2002 Goose Fire, Moab Field Office



By the year 2004, additional campgrounds had been built along the river corridor and dispersed camping had also increased in some tributaries. Tamarisk and Russian olive continued to expand into new areas, and regeneration was rampant in several of the previously treated areas. A potentially serious fire had occurred in April of 2003 at the Highway 191 bridge. Although 60 feet flame lengths and 300 feet spotting had occurred in the heat of the tamarisk fire, this fire was again contained with the help of a fuel break.

Again in 2004, a Determination of NEPA Adequacy was prepared for a riparian restoration project along the riverway that would include hand and mechanical cutting, slash piling and burning, and herbicide treatment of stumps. Approximately 45 acres were targeted for treatment that included establishing fuel breaks at various points along the river and thinning around several campgrounds.

Because the spread of these invasives was an ever-increasing problem throughout the western states, over 300 representatives from federal, state, local, and tribal agencies along with representatives from the private sector met in Washington D.C. in 2004 to discuss the management and control of tamarisk and the restoration of the riparian habitat that it has affected. "Team Tamarisk," as they were called, focused on a large scale tamarisk plan with goals that included the formation of a geographic database of tamarisk populations across the United States as well as support for a biologically-based tamarisk management program that was being developed by the USDA's Agriculture Research Service.

Burn Piles, Onion Creek, Moab Field Office, 2004



The following year, while BLM fuel crews concentrated on burning piles from the 2004 treatments in the Moab Field Office, the State of Utah in cooperation with Utah State University Extension offices and the U. S. Department of Agriculture was planning to implement a promising biological control method for tamarisk. The tamarisk leaf beetle (*Diorhabda elongata*), a mortal enemy of the tamarisk, was tested extensively and approved by the USDA for release in fighting tamarisk infestation. For several months each summer season, tamarisk beetles will

continuously strip leaves from

a tamarisk until it is totally defoliated. The tree appears to die, although it is able to reproduce greenery from its root source by summer's end. Repeated defoliation by the beetle for at least three years may eventually kill a tamarisk tree. This type of biological control can reduce the cost of tamarisk fuel reduction treatments, although cost savings are compromised because the demise of tamarisk on such a large scale results in dense stands of dry brown skeletons that can ramp up fuel loads to hazardous proportions.



Tamarisk Beetle

Beetle Affected Tamarisk, Dewey Bridge, Moab Field Office

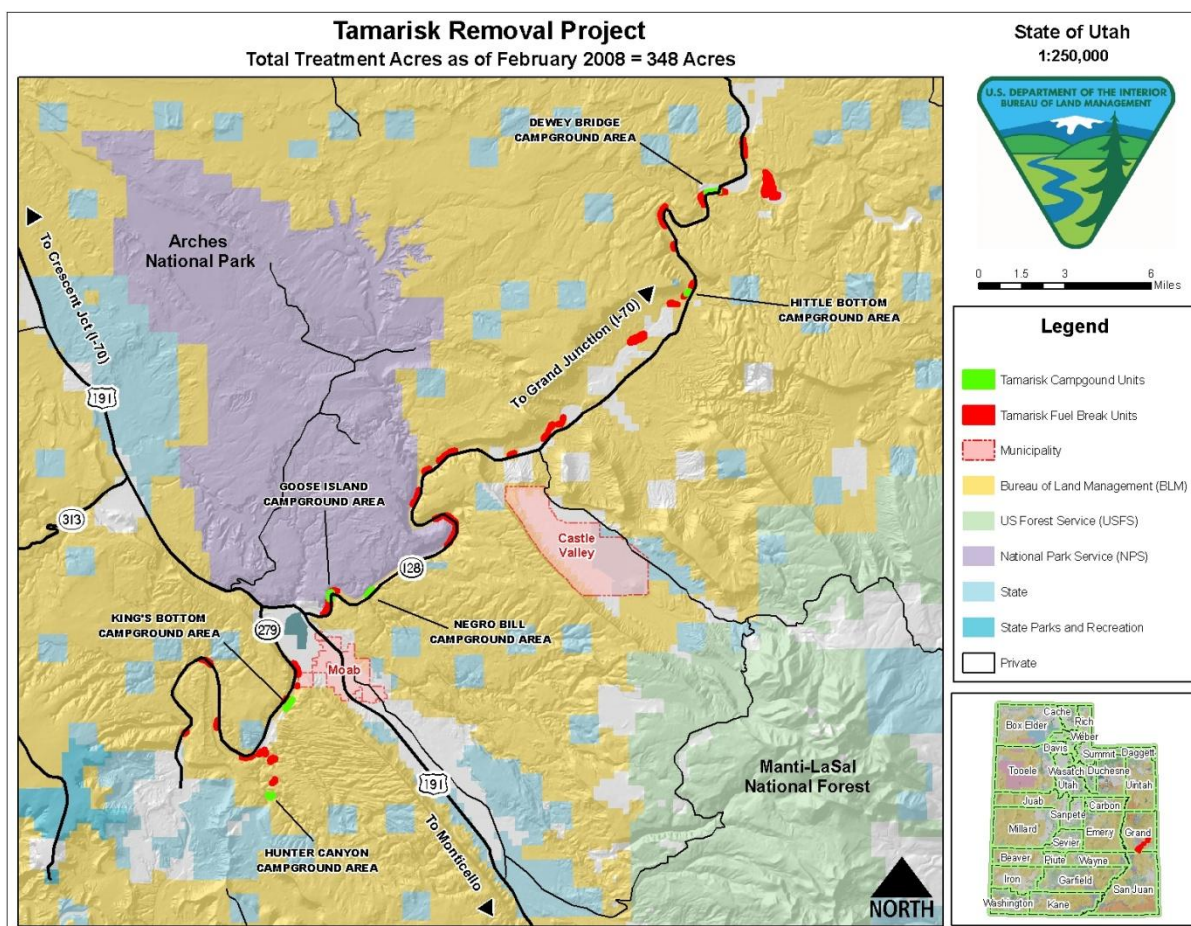


Several areas in Utah were targeted for the release of beetles in 2004, and both Grand and San Juan counties were among the targeted areas. The first and second years resulted in a few clumps of defoliated trees along the Colorado riverway.

In March of 2006, federal, state, county, local organizations and private citizens interested in

riparian restoration along the Colorado River in southeastern Utah formed a collaborative partnership. The partnership, known as Southeast Utah Tamarisk Partnership (SEUTP), is committed to “restoring, protecting, and maintaining a healthy riparian ecosystem in our Colorado River watershed.” Goals include the control and/or removal of tamarisk and Russian olive and responding to the effects of tamarisk beetle. The BLM, Moab Field Office, has been an active participant in SEUTP meetings since the inception of the partnership, and the SEUTP partners have been invaluable in the planning and implementation of the most recent BLM fuels reduction efforts along the river.

The Moab Fire District fire and fuels team continued invasive plant reduction treatments along the river corridor in 2004 and 2005. By the summer of 2006 the tamarisk beetles had multiplied and moved into new areas. Beginning in the spring of 2007, beetles were defoliating dense thickets of tamarisk at the brisk pace of five miles a week along sections of the Colorado River, and by mid-summer tamarisk was totally defoliated along fifty miles of riverbank as well as in tributaries. Long stretches of dry, brown tamarisk prompted the BLM to issue fire restrictions and to close several campgrounds due to the fire hazard. The BLM fuels team intensified planning efforts to stay ahead of the volatile fire situation resulting from beetle kill, and collaborated with the Utah Partners for Conservation and Development (UPCD) to obtain assistance with funding an extensive tamarisk treatment plan.



Goals for the BLM fuels reduction effort were to prevent catastrophic wildfire (ensuring public safety), to protect infrastructure (campground facilities) from wildfire, to remove noxious weeds (Russian olive, tamarisk, knapweed, etc.), and to protect and enhance native vegetation. In 2007, contract crews treated 200 acres by thinning and piling and through use of a bullhog in easily accessible areas. BLM crews also wrapped many cottonwood trunks with wire mesh to discourage damage from beavers during restoration. The crews worked through the winter burning hundreds of piles in and around campgrounds and in the several new fuel breaks that were cut along the riverway.

Bullhog in Tamarisk



Plans for 2008 include pile burning over 100 acres and wrapping cottonwood trunks in a few more areas. Contracted crews will enter previously treated areas to cut stumps and treat both stumps and sprouts with herbicide. In select areas, bare root cottonwood stock and seedlings along with willow cuttings will be planted and fitted with drip irrigation systems. The BLM's goal is to complete the majority of this work before spring visitors arrive.

Many popular campsites have been cleared of tamarisk with little damage to surrounding native vegetation. Interpretive information is being developed to inform the public about invasive species in the riparian ecosystem, to describe the effects of the tamarisk beetle, and to clarify the results of the various control methods and treatments. The BLM is also collaborating with other entities and agencies to sustain the invasive plant reduction program.



Tamarisk Piles to be Burned, Goose Island Campground, Moab Field Office

The tamarisk beetles will be coming out of hibernation in late April or early May and will begin the summer feeding cycle once again. Monitoring studies implemented by the Southeast Utah Tamarisk Partnership and others will determine the number of years of continual defoliation it may take to actually kill the trees along the Colorado River. BLM monitoring studies will focus on fuels treatment activities and results, and future BLM riparian restoration projects will be designed in accordance with monitoring results from the past few years of treatment. Restoration of this critical waterway will require both new treatments and recurrent maintenance activities in previously treated areas. As sections of tamarisk along the riverway succumb to beetle damage, steps will need to be taken to remove the fuels or otherwise alleviate the associated fire hazards. Because of the multiple jurisdictions along the waterway, coordination and collaboration will be a factor in successful restoration.

The BLM lands along the Colorado River under the jurisdiction of the Moab Field Office are only a fraction of the area within the Moab Fire District that has been inundated with invasive species. Portions of the Green River, the San Rafael River, and the Price River in the Price Field office area as well as the San Juan River and the lower Colorado River in the Monticello Field Office area are in need of invasive plant reduction and maintenance. It is expected that the beetle will be affecting each and every waterway containing tamarisk in southeastern Utah, and a catastrophic wildland fire could result from acres of dead trees.



Invasive Plants along the Green River, Price Field Office

The BLM vision for these waterways includes a return to the native riparian biodiversity as well as long-term sustainability of the restored areas. Continued treatments and maintenance of previously treated areas throughout the Moab Fire District is the key to successfully achieving this vision.



Invasives Mixed with Native Species along the San Juan River, Monticello Field Office

The BLM Moab Fire District is committed to sustaining the accomplishments from the past decade of invasive species and hazardous fuels reduction projects in the Moab Field Office, to begin treatments in both the Monticello and Price Field Offices, and to make solid progress toward our vision.